

# Craig Turner Knuth

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## Education

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### University of Michigan

M.S. in Robotics, *GPA: 4.00*

Relevant Coursework: Motion Planning, Model Predictive Control, Mobile Robotics, Machine Learning, Trajectory Optimization

Ann Arbor, MI

May 2020

### University of Wisconsin-Madison

B.S. in Computer Science, B.S. in Mathematics, Certificate in Physics, *GPA: 3.93*

Awards: Dean's List Fall 2012 - Spring 2016

Madison, WI

May 2016

## Professional Experience

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### Integrated Applications, UW-Madison Information Technology

Associate Systems Programmer

Madison, WI

May 2016 - Aug 2018

- Led a team of six developers in design and implementation user interactions in complex systems and workflows in 8-12 projects, 3-5 in active development
- Applied Agile methodology in collaboration with other developers, UI/UX designers, and other stakeholders to design and develop complex data driven web applications
- Collaborated with other groups in the university such as University Communications and the MyUW team to provide strategic technical direction in website creation
- Devised a web stack competency course for new hires

### Integrated Applications, UW-Madison Information Technology

Programmer Intern

Madison, WI

May 2015 - May 2016

- Supported existing Java, PHP, and Groovy applications by improving build systems, implementing usability improvements, and triaging issues
- Gained experience working with technologies such as Docker, AWS, PostgreSQL, Spring, Jenkins, and Elasticsearch

## Research Experience

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### Research in Motion Planning and Control

*Co-advised by Dmitry Berenson (Autonomous Robotic Manipulation Lab) and Necmiye Ozay*

Jan 2019 - Present

- Develop method in MATLAB of determining obstacles and novel path validity from trajectories of mobile agents (*Submitted to RA-LICRA 2020*)
- Investigate control of systems in C++ using learned models and robust control methods to ensure stability and goal reachability
- Apply deep unsupervised learning techniques in Python to learning probabilistic representations of models that are otherwise expensive to compute

### Research in Stochastic Modeling

*Advised by Wai-Tong Fan*

Sept 2015 - Present

- Create simulations of complex evolutionary models of pesticide resistance in agriculture
- Analyze theoretical characteristics and behavior of evolutionary models of pesticide resistance

## Project Experience

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### MobileBot

Nov 2018 - Dec 2018

- Simultaneously mapped and localized position of robot in a maze environment using LiDAR in C++
- Implemented probabilistic robotic methods like particle filters to solve "kidnapped robot" problem

### ArmLab

Sep 2018 - Oct 2018

- Detected and manipulated colored blocks using an actuated arm and Kinect camera in C
- Designed and 3D-printed gripper using CAD software

### BalanceBot

Oct 2018 - Nov 2018

- Composed controller for balancing of two-wheeled robot in C++
- Navigated obstacle course using position information integrated from motion capture system

*Upcoming:* Model Predictive Control applied to self-driving vehicles

**LANGUAGES:** Python, C/C++, MatLab, Java, PHP, Groovy, SQL, Bash, HTML, CSS, Javascript